

CTX 5000

VHF/FM Marine Radiotelephone

- Full 25 Watt transmit power
- Fully synthesized
All US VHF/FM marine channels
- Dual watch channel 16 monitor
- Large high-intensity
LED channel readout
- Reversible front panel
for overhead mounting

Specifications

General:

Frequency range:	
Transmitter:	156.00 – 157.50 MHz
Receiver:	156.00 – 163.00 MHz
Number of channels:	
Transmitter:	45
Receiver:	50
Supply voltage:	13.6 volts DC negative ground
Antenna impedance:	50 ohms
Modulation:	16F3
Microphone impedance:	600 – 2000 ohms
Current drain:	
Transmitter H/L:	5.5A/2.2A
Receiver stby/rated:	0.5A/1.5A
Temperature range:	–20°C to +50°C
FCC:	Part 83 & 15 DOC
Dimensions:	8-1/2"W x 3-1/16"H x 10-7/8"D (216 x 78 x 277 mm)
Weight:	Approx. 7.7 lbs. (3.5 kg)

Transmitter:

Output power:	25W/1W
Deviation:	±5 kHz max. @ 1 kHz
Spurious & harmonics:	–70 dB
Audio frequency response:	+1, –3 dB, 300 – 3000 Hz
Distortion:	5%

Receiver:

Sensitivity:	
–12 dB sinad:	0.3 μ V
20 dB quieting:	0.35 μ V
Squelch sensitivity:	
Threshold:	10 dB noise quieting
Tight:	2 μ V
Modulation acceptance bandwidth:	±7 kHz
Spurious & image rejection:	–70 dB
Intermodulation rejection:	–70 dB
Selectivity:	–70 dB
Hum & noise:	–50 dB
Audio frequency response:	+1, –8 dB, 300 – 3000 Hz
Audio output 10% THD 4 ohms:	5 watts

General Description

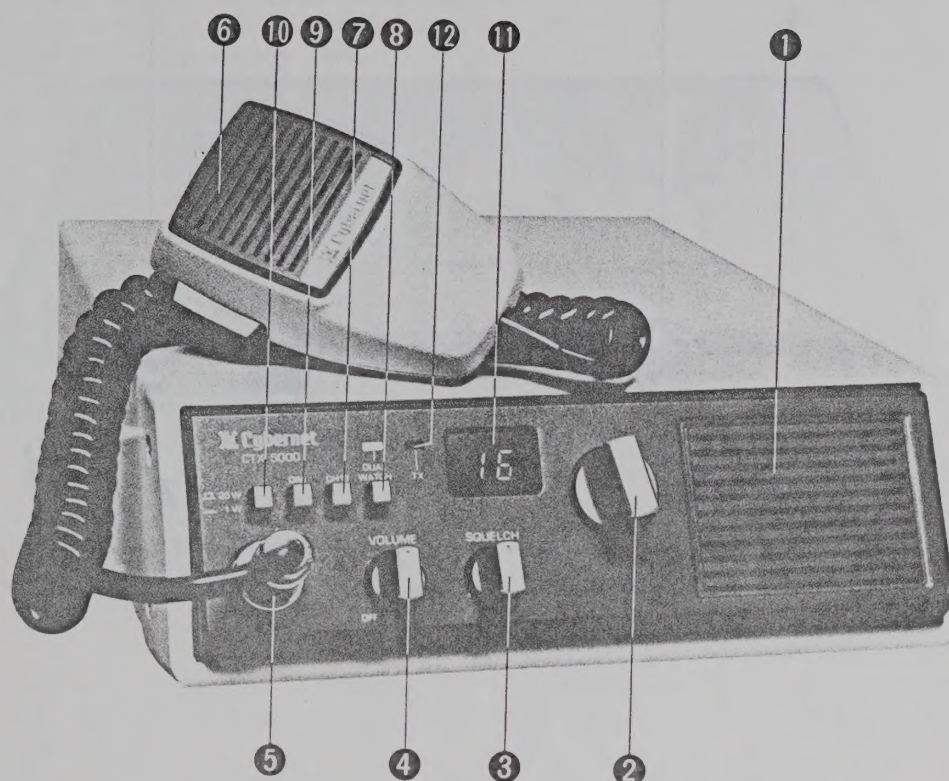
CTX 5000 VHF/FM Radiotelephone

The fully synthesized CTX 5000 VHF/FM marine radiotelephone provides full communication coverage with operation ease. Fully synthesized for all U.S. marine channels with the turn of a dial. The CTX 5000 incorporates the latest technology in its synthesizer to give you the reliability and performance you need. The large LED channel readout has been designed for maximum visibility under wide range of light condition. The CTX 5000 also incorporates the outstanding 'dual watch' feature of monitoring channel 16 distress and any desired channel selected.

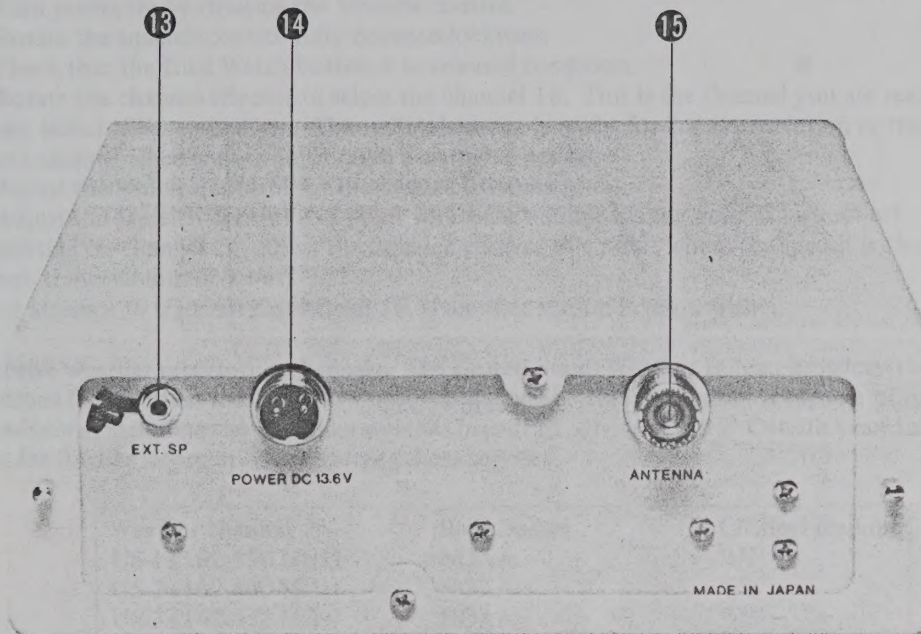
The transmitter section of the radiotelephone has been designed to exceed the requirement of intermittent marine service, which is defined as a 50% duty cycle to 2 minutes transmitting followed by a period of 2 minutes receiving. Operating the transmitter within these limits will assure long trouble-free service. A convenient mounting 'tray' system provides easy mounting under virtually any conditions desired and permits quick removal for servicing.

Before operating the CTX 5000 you must obtain your license. Transmitting without the appropriate license is illegal. The license can be obtained by submitting completed FCC forms 506 and 753 to the Federal Communications Commissions. Furthermore, you are required to read and understand Part 81 and 85 of the FCC rules and regulations prior to operation of this radiotelephone. It is the user's responsibility to see that this radiotelephone is operating at all times in accordance with the FCC rules and regulations. For servicing we recommend that you consult with the dealer from which you purchased the radiotelephone, since you are prohibited by the FCC to adjust the transmitter circuit of the unit unless you hold a current First or Second Class Radiotelephone License. A citizens band or amateur license is not sufficient.

Operating Controls



- ① **Speaker.** Built-in, front mounted speaker.
- ② **Channel selector switch.** Selects any of the available marine channels.
- ③ **Squelch control.** This quiets the receiver section when signals are not being received and thus allows quiet standby operation. Starting at the fully counterclockwise position (minimum squelch), rotate the squelch control clockwise until the receiver is just quieted when no signal is being received. Incoming signals will automatically release the squelch and be heard. Careful adjustment is necessary, since setting the control too far clockwise will not allow weaker signals to overcome the squelch action.
- ④ **Off/Volume control.** This turns the power on and controls the sound output from the built-in speaker. To switch the unit off, rotate the control fully counterclockwise.
- ⑤ **Microphone connector.** This is used for connection of the microphone which is supplied with this radiotelephone.
- ⑥ **Microphone.** With push-to-talk bar at the side.
- ⑦ **Channel 16 button.** This button, when depressed, switches the unit to channel 16 (Distress Calling) regardless of the existing setting of the channel selector and/or the Dual-Watch button.
- ⑧ **Channel 16 auto monitoring (Dual-Watch) button.** Setting this switch on (depressed) will let the receiver start continuous switching between the main channel (selected on the Channel selector) and channel 16, until a signal is actually received.
- ⑨ **Dimmer.** Permits to select the brilliance of the channel readout. Depress the button to reduce the brilliance for nighttime operation, etc.
- ⑩ **Transmit power selector (25W-1W).** Selects either 25W or 1W transmit power. With the button in the released position, the radiotelephone will produce full rated transmitting power for longer communication range. The depressed position of the button will produce 1W for short range communications.
- ⑪ **LED channel readout.** Shows the channel selected.
- ⑫ **Transmit indicator.** Illuminates when transmitting.



Rear Panel Connectors

13 External speaker jack. This jack is used for an external speaker (or horn). Insertion of the speaker plug (standard 1/8" 'phone' plug) in this jack automatically silences the built-in speaker.

Note. A protective rubber seal cap is installed over this jack. Do not remove it unless you are using the jack.

14 13.6V power connector. DC power to operate the unit is fed through this connector using the DC power cables supplied. The connector has a locating key and allows the power plug inserted in only one way.

Align the key onto the connector and do not force it.

15 SO-239 antenna connector. Accepts a PL-259 antenna connector. The cable from an antenna should be terminated with this type of 50 Ohm connector.

Operation

To receive.

Before attempting to operate your radiotelephone, make sure that the antenna is connected to the unit rear antenna connector properly.

- (1) Turn power on by rotating the Volume control.
- (2) Rotate the squelch control fully counterclockwise.
- (3) Check that the Dual Watch button is in released condition.
- (4) Rotate the channel selector to select the channel 16. This is the channel you are required to monitor and to make initial radio contact on. The radiotelephone is ready for instant reception or transmission on the selected channel since it does not require a warm-up period.
- (5) Adjust the Volume control for the desired listening level.
- (6) Adjust the Squelch control to a point where the audible hissing noise is just cut off. If some station is transmitting on channel 16, adjust the Squelch control to a point where the speech is clear but the noise between transmissions is cut off.

Do not attempt to transmit on channel 16, if another station is transmitting.

To receive weather monitoring channels. The United States Weather Bureau broadcasts official weather conditions from certain locations on various frequencies. This transceiver is capable of receiving these transmissions, including the Canadian weather broadcast service (CA-1). Consult your local weather bureau office for further information concerning these services.

Weather channel	Broadcaster	Channel readout
US-1 (162.550 MHz)	NOAA	'U1'
US-2 (162.400 MHz)	NOAA	'U2'
US-3 (162.475 MHz)	NOAA	'U3'
CA-1 (161.650 MHz)	Canadian weather	'C1'

Auto monitoring ('Dual Watch') operation. Your radiotelephone incorporates the dual-watch channel 16 monitoring capability, scanning between any channel selected on the channel selector and channel 16.

Proceed as follows:

- (1) Set the Dual Watch button released initially.
- (2) Adjust the Squelch control slowly, rotating clockwise until the background noise (no transmissions should be present on the channel) just disappears. This adjustment is essential for correct dual-watch operation.
- (3) Select the desired channel you want to dual-watch with channel 16. The channel readout shows the main channel (selected on the channel selector) regardless of the signal existence on the channel 16.
- (4) Depress the Dual Watch button in. If a signal is actually received on channel 16 the 'Dual Watch' lamp located above the button starts flickering; or if no signal is present on the channel 16 the 'Dual Watch' lamp continuously lights up. In this condition (no signal), the radiotelephone is engaged in continuous scanning between the selected (main) channel and the channel 16, and when a transmission is actually received on channel 16 the radiotelephone stops scanning to listen to channel 16 as long as the transmission stays.
- (5) For normal operation, reset the Dual Watch button.

To transmit.

- (1) Monitor channel 16 to be sure the channel is clear before operating your transmitter.
 - (2) Depress the microphone transmit switch and talk into the microphone holding it about 5" to your mouth. The red transmit lamp will go on when the microphone transmit switch is pressed.
- Important.** When the unit is in the 'Dual watch' mode pressing the microphone transmit switch will cause the unit to transmit on the main channel (selected on the channel selector) and **not** on the channel 16. To transmit on the channel 16 be sure to set the Dual Watch button released.
- (3) To receive, release the transmit switch.

Important Operating Notes

Listen to a channel before transmitting on it. You may be interrupting important communication.

Always identify your boat by giving its call sign and name at the beginning and end of each message.

Keep a log book of all distress, emergency, navigation, and safety type of information. Note the date, time, call letters and names of all ships involved and the content of the message. The log book should be signed by the person making entries.

It is against the law to use profane or obscene language on the radio. Remember, you're transmitting on a party line.

Installation

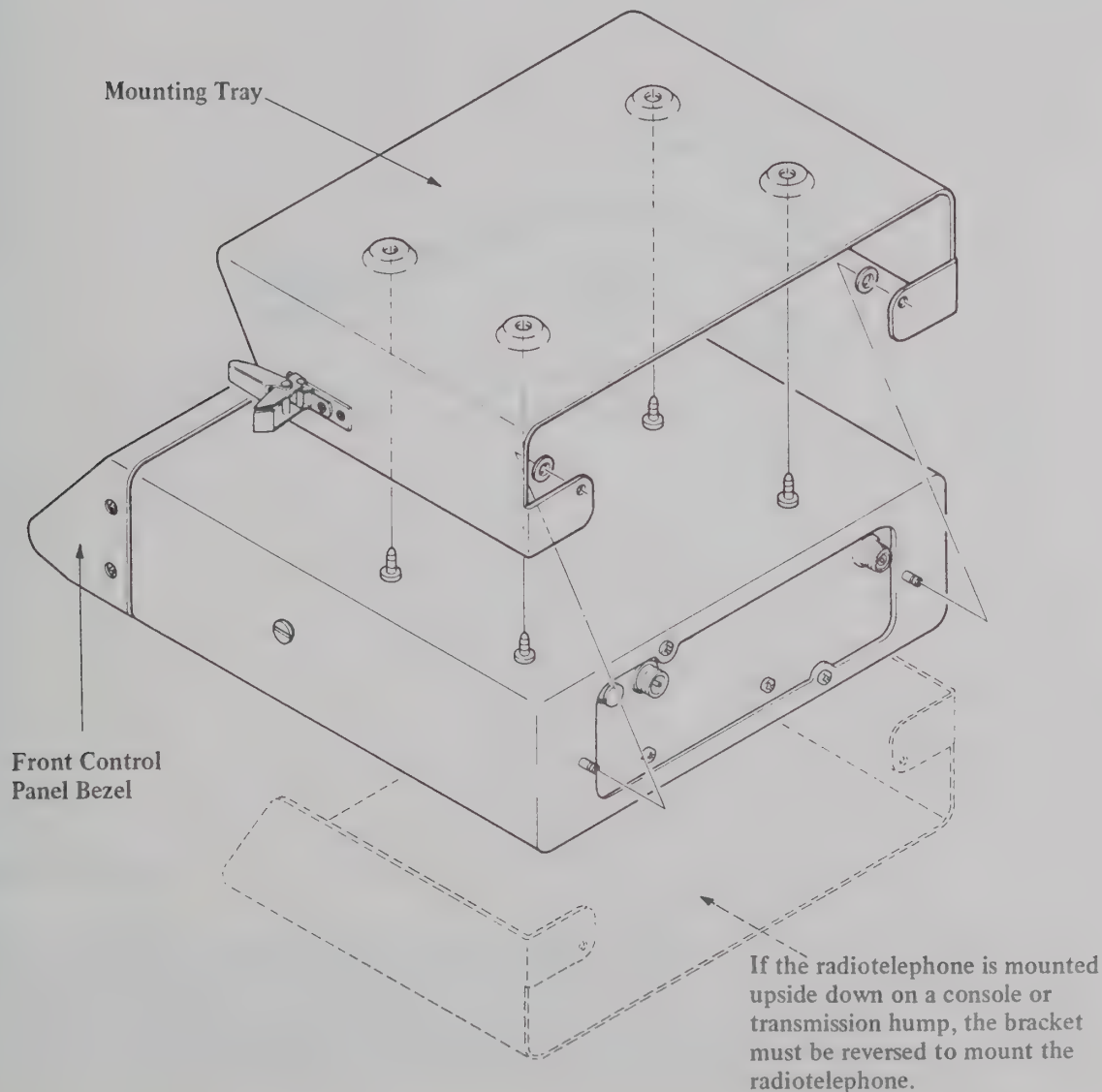
Location. Before installing the radiotelephone, choose a location which is protected from moisture and excessive heat. Although built for marine service, the unit must be protected from direct exposure to the elements. Make sure the location chosen is one in which it is convenient to operate the unit. Also bear in mind that the microphone bracket will have to be mounted in the same general area. In ships where more than one operating position is provided, one may be open the weather (flying bridge, cockpit, etc.), it is recommended that the unit is normally kept in the more sheltered position.

Mounting-Tray. The radiotelephone may be mounted to the underside of the instrument panel or dashboard of a boat, car, etc. by means of a special mounting tray supplied with the radiotelephone. Attach the bracket to the location selected using four screws supplied.

Radiotelephone installation to the tray. Grasp the radiotelephone and insert the rear of the radiotelephone as shown. Gently push the radiotelephone backward so that the guide-pins on the rear of the radiotelephone mate with holes on the tray. Do not force it.

Engage the snap fasteners to the metal lugs on both sides of the radiotelephone. Push the fastener latch to fix the radiotelephone securely. When removing the radiotelephone from the tray, use reverse manner.

Overhead mounting. If you want to mount the radiotelephone overhead on the cockpit ceiling, etc. the mounting tray should be mounted up side down on the ceiling. The front control panel bezel will also have to be reversed downward for an operating convenience. Ask your local Cybernet dealer for professional service.



Power Connection

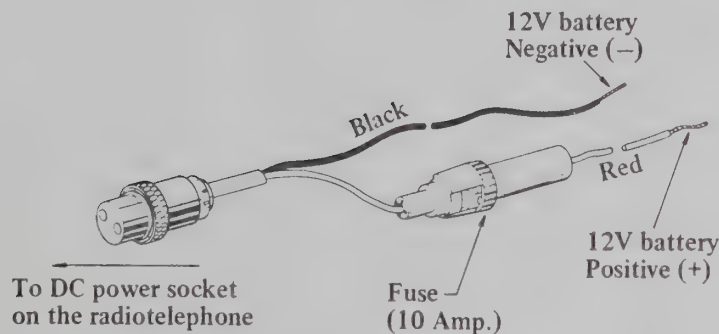
Important: This unit is designed for operation from 12-Volt negative ground electrical system. Do not attempt to use it in a positive ground system.

The DC power cable supplied is used to make the necessary DC voltage connections to boat's battery line. Choose a point which is capable of handling at least 6 amps (never use a lighting circuit, for example). The switched side of the ignition switch is usually a suitable point for the **positive (+)** 12 volt connection. Neatly run the power cable leads to this location. If you must extend the power leads, keep the wiring as short as possible, since long wires can cause a voltage drop which will affect the performance of the radiotelephone. Use #10 wire for extensions up to 10 feet and #8 wire for longer extensions.

Connect the red (fused) lead to the positive (+) battery line, and the black wire to the hull ground (**battery -**), usually the same as the engine ground. In transceiver installations, the ground system is very important and has a great effect on communication range.

Reverse battery connections (reversing battery polarity) will automatically actuate the protection circuit in the unit and cause the fuse to blow, thus protecting the unit from damage. If the fuse blows, turn the power switch off and check reverse battery connection. Replace the fuse with one having **10A** rating, since any fuses higher than this value may cause damage to the radiotelephone.

The other end of the DC power cable is terminated with a screw-in type 2-pin plug. Always line up the keyway properly before pushing the power cable connector into the transceiver socket. Do not attempt to force the connector; when properly lined up, the connector can be inserted easily. Rotate the screw-ring on the plug to secure it to the socket.



Antenna Connection

Use a VHF marine antenna which meets the 50 ohm termination requirements. It should be mounted as high as possible for maximum range. Connect it to the antenna connector on the rear panel of the radiotelephone, using 50 ohm coaxial cable with a **PL-259** connector.

Since there are a large number of VHF marine antennas available, you should consult the dealer from whom you purchased the unit for further information on marine antennas that meet your specific needs.

Base Installation

Power Connection. The radiotelephone may be operated from 105 – 120V, 50/60 Hz AC when used with any AC power supply unit which meets the voltage and current requirements of the unit (13.6V DC, 6A or higher).

Simply connect the **red** lead in the unit's power cable to the **positive** DC terminal of the AC power supply unit and the **black** wire to the **negative** terminal.

Base Station Antenna. The base station antenna should be as high as possible, FCC Rules and Regulations permitting. Local ordinances dealing with antenna height should be checked before antenna installation. Base station antennas should be of a high-gain type, exhibiting a low angle of radiation. This type of antenna provides gains of up to 12 dB which is equal to increasing the effective transmit power output several times. High gain antennas also increase the strength of the received signal by an equal ratio as previously. At VHF frequencies, the antenna height is a most significant factor in determining communication range.

COMPREHENSIVE VHF-FM MARINE RADIOTELEPHONE CHANNELS . . . by Designator

OPERATING CHANNEL DESIGNATIONS		FREQUENCY (MHz)		TYPE OF TRAFFIC	FUNCTION	
ORIGINAL	ADDITIONAL	SHIP TX	COAST TX		SHIP/SHIP	SHIP/ShORE
1		156.05	160.65	International Only	—	Yes
2		156.1	160.7	International Only	—	Yes
3		156.15	160.75	International Only	—	Yes
4		156.2	160.8	International Only	—	Yes
5		156.25	160.85	International Only	—	Yes
6		156.3	—	SAFETY	Yes	No
7		156.35	160.95	International Only	—	Yes
7A		156.35	156.35	Commercial	Yes	Yes
8		156.4	—	Commercial	Yes	No
9		156.45	156.45	Commercial	Yes	Yes
9		156.45	156.45	Non-Commercial	Yes	Yes
10		156.5	156.5	Commercial	Yes	Yes
11		156.55	156.55	Commercial	Yes	Yes
12		156.6	156.6	Port Operations, USCG	Yes	Yes
13		156.65	156.65	Locks, Canals, Pilots	Yes	Yes
14		156.7	156.7	Port Operations, USCG	Yes	Yes
15		156.75	156.75	Environ., Hydrographic	Ship Receive Only	Ship Receive Only
16		156.8	156.8	DISTRESS CALLING	Yes	DISTRESS CALL
17		156.85	156.85	State Control Restricted	No	Yes
18		156.9	161.6	International Only	Yes	Yes
18A		156.9	156.9	Commercial	Yes	Yes
19		156.95	161.55	International Only	Yes	Yes
19A		156.95	156.95	Commercial	Yes	Yes
20		157.0	161.6	Port Operations	No	Yes
21		157.05	161.65	International Only	—	Yes
21CG		157.05	157.05	USCG Restricted	Yes	Yes
22		157.1	161.7	International Only	—	Yes
22CG		157.1	157.1	USCG Restricted	Yes	Yes
23		157.15	161.75	International Only	—	Yes
23CG		157.15	157.15	USCG Restricted	Yes	Yes
24		157.2	161.8	Public Corresp.	No	Yes
25		157.25	161.85	Public Corresp.	No	Yes
26		157.3	161.9	Public Corresp.	No	Yes
27		157.35	161.95	Public Corresp.	No	Yes
28		157.4	162.0	Public Corresp.	No	Yes
	60	156.025	160.625	International Only	Ship Receive Only	Ship Receive Only
	61	156.075	160.675	International Only	"	"
	62	156.125	160.725	International Only	"	"
	63	156.175	160.775	International Only	"	"
	64	156.225	160.825	International Only	"	"
	65	156.275	160.875	International Only	Yes	Yes
	65A	156.275	156.275	Port Operations	Yes	Yes
	66	156.325	160.925	International Only	Yes	Yes
	66A	156.325	156.325	Port Operations	Yes	Yes
	67	156.375	—	Commercial	Yes	No
	68	156.425	156.425	Non-Commercial	Yes	Yes
	69	156.475	156.475	Non-Commercial	Yes	Yes
	70	156.525	—	Non-Commercial	Yes	No
	71	156.575	156.575	Non-Commercial	Yes	Yes
	72	156.625	—	Non-Commercial	Yes	No
	73	156.675	156.675	Port Operations	Yes	Yes
	74	156.725	156.725	Port Operations	Yes	Yes
	75	GUARD CHANNEL		—	—	—
	76	GUARD CHANNEL		—	—	—
	77	156.875	—	Commercial	Yes	No
	78	156.925	161.525	International Only	Yes	Yes
	78A	156.925	156.925	Non-Commercial Only	No	Yes
	79	156.975	161.575	International Only	Yes	Yes
	79A	156.975	156.975	Commercial	Yes	Yes
	80	157.025	161.625	International Only	Yes	Yes
	80A	157.025	157.025	Commercial	—	Yes
	81	157.075	161.675	International Only	—	Yes
	82	157.125	161.725	International Only	—	Yes
	83	157.175	161.775	International Only	—	Yes
	83CG	157.175	157.175	USCG Aux. Only	Yes	Yes
	84	157.225	161.825	Public Corresp.	No	Yes
	85	157.275	161.875	Public Corresp.	No	Yes
	86	157.325	161.925	Public Corresp.	No	Yes
	87	157.375	161.975	Public Corresp.	No	Yes
	88	157.425	162.025	International Only	Yes	Yes
	88A	157.425	—	Commercial	Yes	No
WE ₁		—	162.55	NOAA Weather	Ship Receive Only	Ship Receive Only
	WE ₂	—	162.4	NOAA Weather	"	"
WE ₃		—	162.475	"	"	"
	WE ₄	—	161.650	"	"	"

Check locally for Channels Authorized or used in your Area.

USA VHF-FM MARINE RADIOTELEPHONE CHANNELS ... by Function

OPERATING CHANNEL DESIGNATORS		FREQUENCY (MHz)		POINTS OF COMMUNICATION	TYPE OF TRAFFIC
ORIGINAL	ADDITIONAL	SHIP TX	COST TX		
DISTRESS, SAFETY AND CALLING					
16		156.8	156.8	Ship/Ship, Ship/Shore	DISTRESS CALLING
INTERSHIP SAFETY					
6		156.3	156.3	Ship/Ship	SAFETY
NAVIGATIONAL BRIDGE TO BRIDGE					
13		156.65	156.65	Ship/Ship, Ship/Shore	Locks, Canals, Pilots, Bridges
ENVIRONMENTAL					
15		—	156.75	Shore to Ship, Rev Only	Environ., Hydrographic
STATE CONTROL					
17		156.85	156.85	Ship/Shore	RESTRICTED
PORT OPERATIONS					
12		156.6	156.6	Ship/Ship, Ship/Shore	USCG
14		156.7	156.7	"	USCG, Port Auth.
20		157.0	161.6	Ship/Shore Only	Port Operations, USA
	65A	156.275	156.275	Ship/Ship, Ship/Shore	"
	66A	156.326	156.325	"	"
	73	156.675	156.675	"	"
	74	156.725	156.725	"	"
COMMERCIAL					
7A		156.35	156.35	Ship/Ship, Ship/Shore	Commercial, USA
8		156.4		Ship/Ship Only	"
9		156.45	156.45	Ship/Ship, Ship/Shore	"
10		156.5	156.5	"	"
11		156.55	156.55	"	"
18A		156.9	156.9	"	"
19A		156.95	156.95	"	"
	67	156.375	-	Ship/Ship Only	Work boats
	77	156.875	-	"	Commercial, USA
	79A	156.975	156.975	Ship/Ship, Ship/Shore	"
	80A	157.025	157.025	"	"
	88A	157.425	-	Ship/Ship Only	Fishing Vessels
NON-COMMERCIAL					
9		156.45	156.45	Ship/Ship, Ship/Shore	Clubs, Marinas, Yards, etc.
	68	156.425	156.425	Ship/Ship, Ship/Shore	Yachts
	69	156.475	156.475	Ship/Ship, Ship/Shore	Clubs, Marinas, Yards, etc.
	70	156.525	-	Ship/Ship Only	Yachts
	71	156.575	156.575	Ship/Ship, Ship/Shore	Clubs, Marinas, Yards, etc.
	72	156.625	-	Ship/Ship Only	Yachts
	78A	156.925	156.925	Ship/Shore Only	Clubs, Marinas, Yards, etc.
	83CG	157.175	157.175	Ship/Ship, Ship/Shore	USCG Aux. Only
PUBLIC CORRESPONDENCE					
24		157.2	161.8	Ship/Public Coast	Telephone Corresp.
25		157.25	161.85	"	"
26		157.3	161.9	"	"
27		157.35	161.95	"	"
28		157.4	162.0	"	"
	84	157.225	161.825	"	"
	85	157.275	161.875	"	"
	86	157.325	161.925	"	"
	87	157.375	161.975	"	"
NOAA WEATHER SERVICE					
WE ₁		-	162.55	Ship Receive Only	Weather Broadcasts
	WE ₂	-	162.4	"	"
WE ₃		-	162.475	Ship Receive Only	Weather Broadcasts
	WE ₄	-	162.650	"	"

Check locally for Channels Authorized or used in your Area.

Alignment Procedure

Your **CTX-5000** has been fully aligned at the factory before shipment to you and does not normally require further adjustment. When necessary, however, the unit may be aligned as indicated hereinafter. It is recommended that you do not try to adjust any circuit in this radiotelephone unless you entirely understand circuit operation and have enough experience in this field of marine radiotelephone and high quality test equipment. Since the radiotelephone is most precise and sophisticated, tampering with the unit may cause upsetting the alignment and lowers its performance.

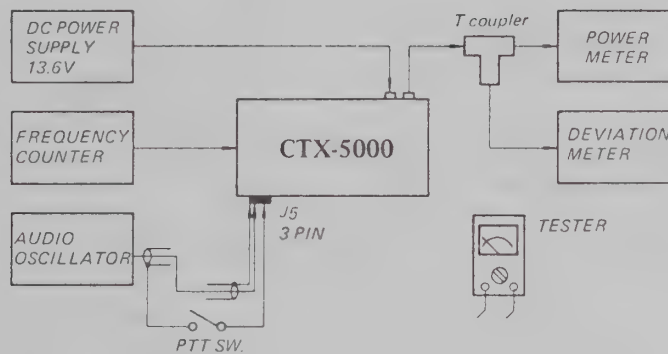
Equipment Required.

Following equipment are required for the alignment.

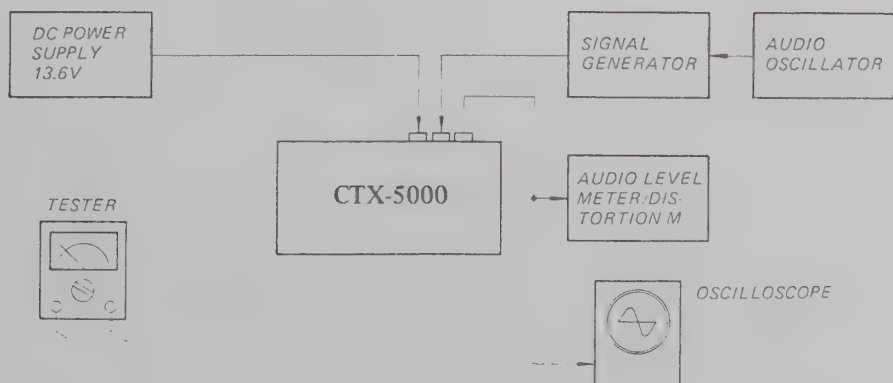
- (1) Regulated DC Power Supply, 0 – 20V, 10A or higher.
- (2) Audio Signal Generator, 10 Hz – 20 kHz.
- (3) RF VTVM, Probe type, 150 MHz.
- (4) Circuit Tester or Digital Voltmeter.
- (5) Frequency Counter, 0 – 250 MHz, high impedance input.
- (6) Deviation Meter.
- (7) Synchroscope.
- (8) RF Dummy Resistor, 50 ohms, 30W.
- (9) RF Power Meter, 50 ohms impedance, 25W or higher.
- (10) T-coupler.
- (11) Drivers, as shown.



Transmitter Alignment Test Setup.



Receiver Alignment Test Setup.



PLL Circuit Alignment

① VCO Frequency-Shift Voltage Check

Connect circuit tester (+) to R-27 (on PTBM116).

Test Equipment	Unit	Adjust	Procedure
	RX mode, channel 06. (Simplex mode)	—	Check for about 1.1V.
	RX mode, channel 28. (Duplex mode)	—	Check for about 2.4V.
	TX mode, any channel.	—	Check for about 5.5V.

② VCO Control Voltage – Pre-adjustment

Connect circuit tester across TP-5 and ground.

Test Equipment	Unit	Adjust	Procedure
	RX mode, channel 06.	L-8	Adjust L-8 for 2.0V.

③ VCO Buffer/Mixer Alignment

Connect synchroscope to L-12/C-103 junction.

Test Equipment	Unit	Adjust	Procedure
	TX mode (Depress PTT bar on mic), channel 28.	T-15, T-16.	Adjust T-15 and T-16 for maximum sharply-defined display without no 'ghost'.



0.3 Vp-p

④ Reference Oscillator (12.8 MHz) Alignment

Connect frequency counter to U-5 (PLL02) #2 pin.

Test Equipment	Unit	Adjust	Procedure
	RX mode, channel 28.	CT-1	Adjust for 3.400000 MHz.

⑤ Receiver Local Oscillator Alignment

Connect frequency counter to Q11 collector.

Test Equipment	Unit	Adjust	Procedure
	RX mode, channel 16 (Simplex mode).	CT-4	Adjust for 145.100300 MHz $\pm$ 50 Hz.
	RX mode, channel 28 (Duplex mode).	CT-3	Adjust for 150.300300 MHz $\pm$ 50 Hz.

⑥ TX Frequency Alignment

Connect frequency counter to Q-24 collector.

Test Equipment	Unit	Adjust	Procedure
	TX mode channel 06.	CT-2	Adjust CT-2 for 156.800300 MHz $\pm$ 50 Hz.

⑦ VCO Control Voltage Alignment

Connect circuit tester across TP-5 and ground.

Test Equipment	Unit	Adjust	Procedure
	RX mode, channel 06.	L-8	Adjust L-8 for 2.0V.

Transmitter Alignment (See TX Alignment Set-up)

Depress PTT switch on microphone to set unit to TX mode.

① TX Buffer (Q24)/Driver (Q25) Adjustment

Connect tester across TP-6 and ground, then TP-7 and ground.

Test Equipment	Unit	Adjust	Procedure
	TX mode, channel 16, Power/Hi-Lo switch to Hi (25W).	(Temporarily, set RV-2 and RV-3 fully clockwise.) T-17, T-18. T-19, T-20.	Adjust T-17 and T-18 for maximum (1.1 – 1.5V). Connect tester across TP-7 and ground. Adjust T-19 and T-20 for maximum (0.2 – 0.4V).

② RF Driver/Power Amplifier/APC Adjustment

Connect Wattmeter across antenna and ground.

Test Equipment	Unit	Adjust	Procedure
	TX mode, channel 16, Power/Hi-Lo switch to Hi (25W). Set Power/Hi-Lo switch to (1W).	CT-5, CT-6, CT-7 and CT-8. RV-2 RV-3	Adjust CT-5, CT-6, CT-7 and CT-8 for maximum power on Wattmeter. Repeat as necessary. Adjust RV-2 for 25W RF power output. Adjust RV-3 for 0.8W RF power output.

③ Maximum Frequency Deviation Alignment

Connect deviation meter across T-type CM-coupler which is connected to antenna and ground. Connect audio signal generator to microphone input circuit.

Test Equipment	Unit	Adjust	Procedure
Audio signal generator output to microphone input circuit, 1,000 Hz 100 mV audio, then 1,000 Hz 3 mV audio.	TX mode, channel 16.	RV-1	Adjust RV-1 for 4.8 kHz deviation. Reduce audio generator output down to 3 mV. Check deviation meter gives more than 3 kHz deviation.

Receiver Alignment (See RX Alignment Set-up)

Set the squelch control fully counterclockwise and the volume control to about 1 o'clock position.

① Local Oscillator Level Adjustment

Connect tester across TP-1 and ground.

Test Equipment	Unit	Adjust	Procedure
	RX mode, channel 16.	T-11, T-12, T-13	Adjust T-11, T-12, and T-13 for maximum reading on tester (1.8 – 2.5V).
	RX mode, channel 28.	T-12	Adjust T-12 for maximum reading (1.8 – 2.5V).

② RF Amplifier/Mixers Adjustment

Connect tester across TP-3 and ground.

Test Equipment	Unit	Adjust	Procedure
FM signal generator output, 156.800 MHz, to antenna input.	RX mode, channel 16.	T-1, T-2, T-3, T-4, T-5, T-6, T-7, and T-8.	Adjust T-1 thru T-8 for maximum reading on tester. Tester reading will be gradually increased. Keep the reading within 1.5 – 2.5V by accordingly reducing generator output level.
Tune to 162.000 MHz.	RX mode, channel 28.	T-2	Adjust T-2 for maximum.

③ IF Amplifier Adjustment (IF = 11.7 MHz, 455 kHz)

Connect tester across TP-3 and ground.

Test Equipment	Unit	Adjust	Procedure
(Remove generator output.)	RX mode, no signal.	T-6, T-7, T-8.	Adjust T-6, T-7 and T-8 for maximum reading.

PLL Channel Programming Table

O = ON

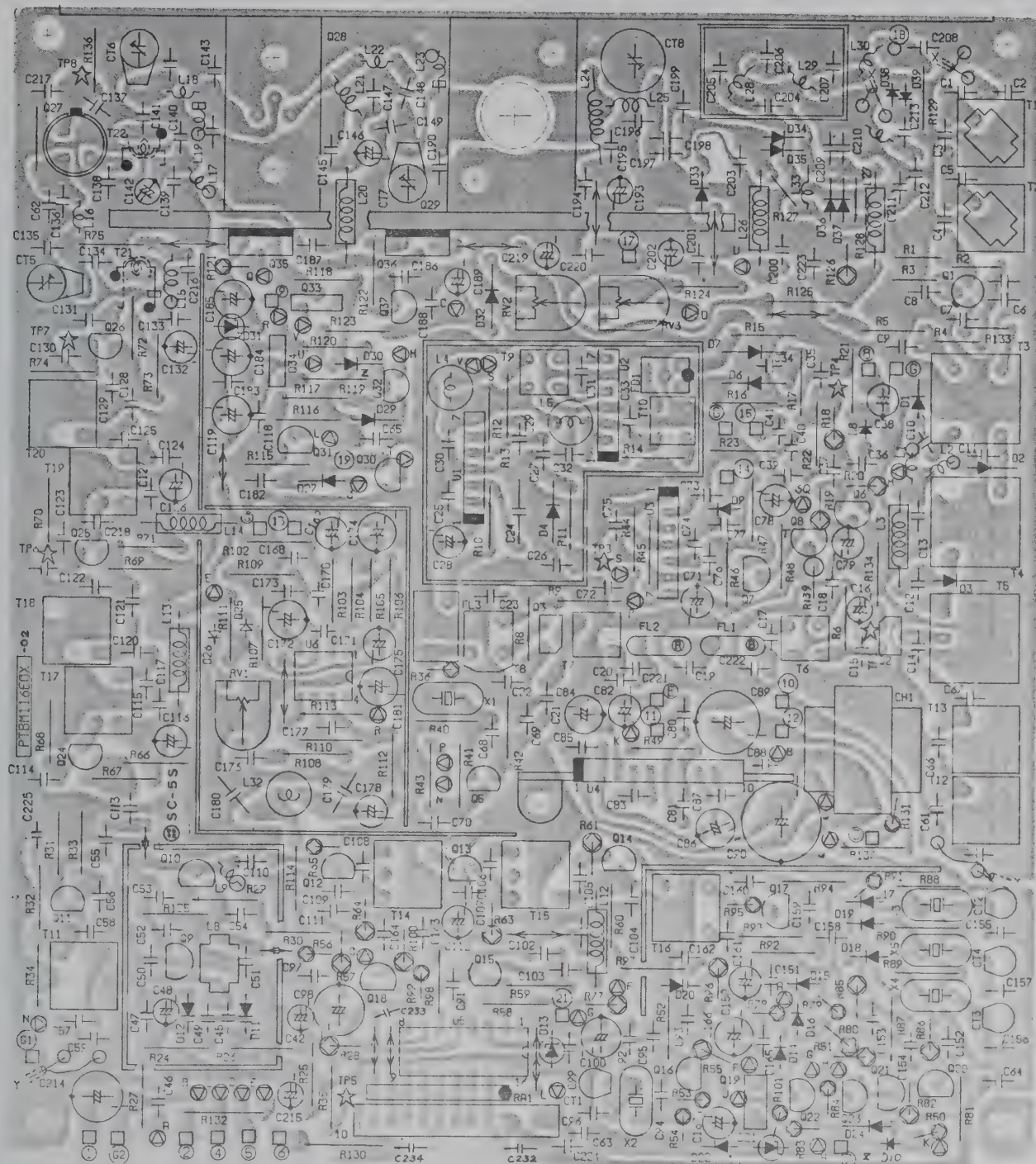
CH NO.	Programming Codes														f_{TX} (MHz)	f_{RX} (MHz)	f_{VCO} (MHz)			f_{IN} (MHz)	N	RX f_{OFFSET} A: 142.3 MHz B: 146.9 MHz	RX-ONLY Channel			
	1 P_0	2 P_1	3 P_2	4 P_3	5 P_4	6 P_5	7 P_6	8 P_7	9 P_8	10 D/S	11 RX	12	13	14												
1	U1	O	O				O	O		O	O						162.550		f_{TX}	$f_{RX}-11.7\text{MHz}$	150.850	3.950	316		B	O
2	U2	O	O	O			O			O	O						162.400			150.700	3.800	304		B	O	
3	U3	O			O		O			O	O						162.475			150.775	3.875	310		B	O	
4	C1	O	O	O	O					O	O	O					161.650			149.950	3.050	244		B	O	
5	O5	O	O		O		O			O	O						160.850		(f_{TX})	149.150	2.250	180		B		
6	O6	O	O				O			O							156.300			144.600	2.300	184		A		
7	O7	O	O				O			O							156.350			144.650	2.350	188		A		
8	O8	O	O	O	O					O							156.400			144.700	2.400	192		A		
9	O9	O	O		O	O				O							156.450			144.750	2.450	196		A		
10	O10	O	O			O	O			O							156.500			144.800	2.500	200		A		
11	O11	O	O			O	O			O							156.550			144.850	2.550	204		A		
12	O12	O	O	O		O				O							156.600			144.900	2.600	208		A		
13	O13	O	O		O		O			O							156.650			144.950	2.650	212		A		
14	O14	O	O	O		O				O							156.700		∇	145.000	2.700	216		A		
15	O15	O	O			O				O	O						156.750		∇	145.050	2.750	220		A	O	
16	O16	O	O	O	O					O							156.800		(f_{TX})	145.100	2.800	224		A		
17	O17	O	O		O	O				O							156.850			145.150	2.850	228		A		
18	O18	O	O	O						O							156.900			145.200	2.900	232		A		
19	O19	O	O		O					O							156.950			145.250	2.950	236		A		
20	O20	O	O	O	O					O	O						157.000			149.900	3.000	240		B		
21	O21	O	O		O					O							157.050			145.350	3.050	244		A		
22	O22	O	O							O							157.100			145.400	3.100	248		A		
23	O23	O	O							O							157.150			145.450	3.150	252		A		
24	O24	O	O	O	O	O				O							157.200			150.100	3.200	256		B		
25	O25	O			O	O	O			O							157.250			150.150	3.250	260		B		
26	O26	O	O	O		O	O			O							157.300			150.200	3.300	264		B		
27	O27	O	O			O	O			O							157.350			150.250	3.350	268		B		
28	O28	O	O	O		O	O	O		O							157.400		∇	150.300	3.400	272		B		

$T_X f_{OFFSET} = 154.0\text{ MHz}$.

O = ON

CH NO.	Programming Codes														f_{TX} (MHz)	f_{RX} (MHz)	f_{VCO} (MHz)			f_{IN} (MHz)	N	RX f_{OFFSET} A: 142.3 MHz B: 146.9 MHz	RX-ONLY Channel
	1	2	3	4	5	6	7	8	9	10	11	12	13	14									
	P ₀	P ₁	P ₂	P ₃	P ₄	P ₅	P ₆	P ₇	P ₈	D/S	RX												
29	65	O		O			O		O						156.275	156.275	(f_{TX})	144.575	2.275	182	A		
30	66	O		O			O		O						156.325	156.325		144.625	2.325	186	A		
31	67	O					O		O						156.375	156.375		144.675	2.375	190	A		
32	68	O		O	O	O			O						156.425	156.425		144.725	2.425	194	A		
33	69	O		O	O	O			O						156.475	156.475		144.775	2.475	198	A		
34	70	O		O	O	O			O						156.525	156.525		144.825	2.525	202	A		
35	71	O			O	O			O						156.575	156.575		144.875	2.575	206	A		
36	72	O		O		O			O						156.625	156.625		144.925	2.625	210	A		
37	73	O			O		O		O						156.675	156.675		144.975	2.675	214	A		
38	74	O		O		O			O						156.725	156.725		145.025	2.725	218	A		
39	77	O			O				O						156.875	156.875		145.175	2.875	230	A		
40	78	O		O		O			O						156.925	156.925		145.225	2.925	234	A		
41	79	O			O				O						156.975	156.975		145.275	2.975	238	A		
42	80	O		O					O						157.025	157.025		145.325	3.025	242	A		
43	81	O			O				O						157.075	157.075		145.375	3.075	246	A		
44	82	O		O					O	O					157.125	161.725		150.025	3.125	250	B		
45	83	O							O						157.175	157.175		145.475	3.175	254	B		
46	84	O		O	O	O	O	O							157.225	161.825		150.125	3.225	258	B		
47	85	O			O	O	O	O							157.275	161.875		150.175	3.275	262	B		
48	86	O		O	O	O	O	O							157.325	161.925		150.225	3.325	266	B		
49	87	O			O	O	O	O							157.375	161.975		150.275	3.375	270	B		
50	88	O		O		O	O	O							157.425	157.425	✓	145.725	3.425	274	A		

T_X f_{OFFSET} = 154.0 MHz.

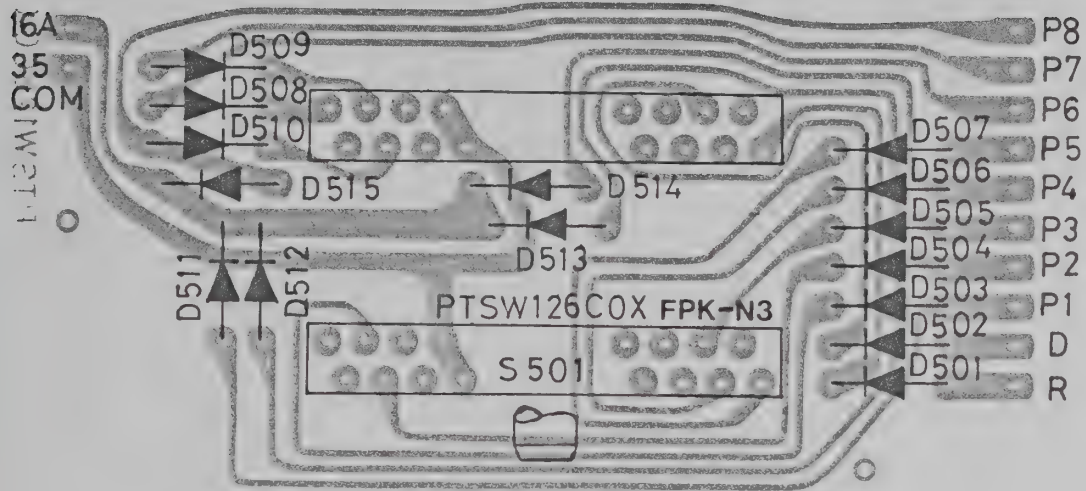


9 6 2 7 G B A F O

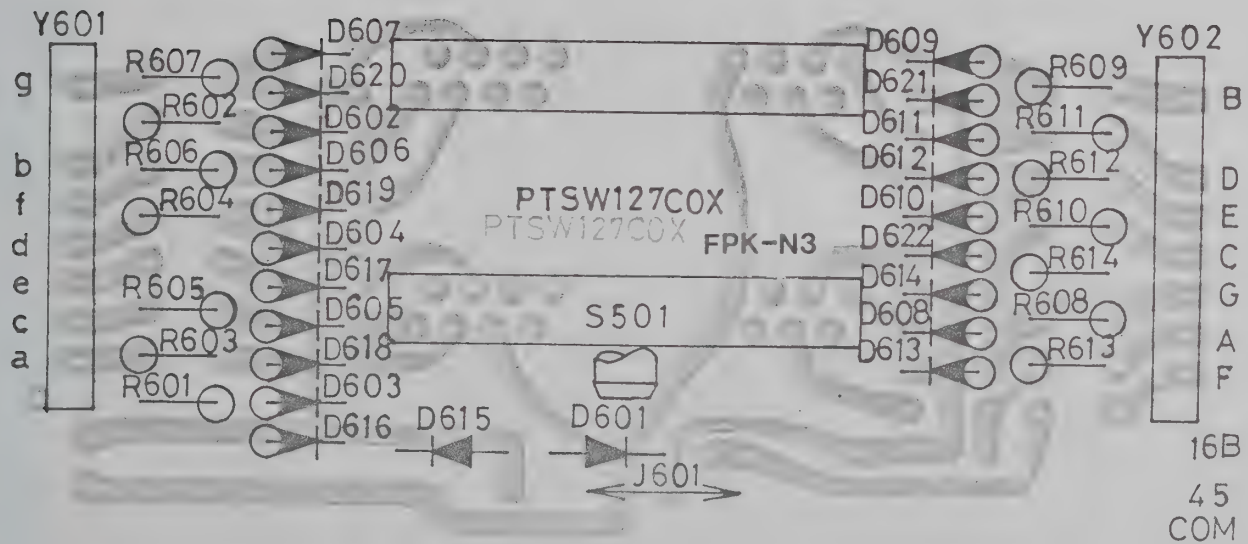
FRX-N3

PRI007400X

PTSW126



PTSW127



Replacement Part List

ITEM	PART NAME		PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.			QTY USED
	REMARKS	FLC. ELEMENTS								
1	EXPLODED	APTR41169A			P.W. BOARD ASSY					
2	EXPLODED	APTLD274A			P.W. BOARD ASSY					
3	EXPLODED	APTSW123AA			P.W. BOARD ASSY					
4	EXPLODED	APTSW127AA			P.W. BOARD ASSY					
5	EXPLODED	APTSW129AA			P.W. BOARD ASSY					
6	EXPLODED	APTZZ275AA			P.W. BOARD ASSY					
7		CCDFD300C4			CERAMIC CAP.	CJ 3PF 500V -0.25, +0.25PF	C403			
8		CCDF120K04			CERAMIC CAP.	12PF 500V -10, +10% CH	C402			
9		CKDB102P04			CERAMIC CAP.	1000PF 50V -0, +100% E	C405	C406	C407	C408
10		CKDB103K04			CERAMIC CAP.	0.01MFD 50V -10, +10% B	C401			
11		CKDB103P04			CERAMIC CAP.	0.01MFD 50V -0, +100% E	C404	C409		
12		GTX5000A02			WIPES KIT					
13		LA1667034			RF COIL		L401			
14		MS325R0004			GND. WASHER					
15		QDS5K36B4E			SI-DIODE	SR3AM8	D401			
16		RVNA203B05			VR.		VR2			
17		PVVR103A12			VR.		VR1/S1			
18		YJ002503Z			COAXIAL JACK		J2			
19		YJ103503Z			3P JACK		J3			
20		YJZ02504Z			DC JACK		J1			
21		YJZ045007			4P MIC JACK		J4			

	PART NAME	PART CODE	PART NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.	Q'TY USED
ITEM NO.	REMARKS	PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.	Q'TY USED
1		ZPA064101J		LAMP		PL2	1
2		ZPA064114J		LAMP		PL1	1
3		ZQA0570803		SPEAKER	57-MM 8-OHM 1-WATT S	SP1	1
4		ZZZ0000004		F-BRAID WIRE			2
5							
6							
7							
8							
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ITEM NO.	PART NAME		PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.	QTY USED
	MECH. ELEMENTS	PART CODE						
1		AMTX500001			ESCUTCHEON ASSY			1
2		ML681SZ022			SIDE CHASSIS - L			1
3		MS523SD001			VOL. SQ. BASE			1
4		MS867AK001			REAR PANEL			1
5		VB886SX002			CABINET COVER			1
6		VN276SP034			KNOB, VOL. SQ.			2
7		VN286SP029			KNOB, CH SELECTOR			1
8		VE86JSX009			ESCUTCHEON BEZEL			1
9		VW902RB003			RUBBER SHIELD			1
10		VS865RF001			REAR PANEL GASKET			1
11								
12					- MISCELLANEOUS -			
13		KTTX5000XX			OPERATION MANUAL			1
14		KC000023AX			FCC FORM 753			1
15		KZ000042XX			FCC FORM 506			1
16		KKTX500001			CARTON			1
17		ACDC085GEA			DC POWER CORD ASSY	IN-LINE FUSED 10 A		1
18		AYTX500001			TRAY ASSY			1
19		ZGAAZ501G0			MICROPHONE	500 OHM		1
20								
21								

ITEM	PART NAME		PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS		SYMBOLIC OR EXPLODED VIEW NO.		QTY USED
	REMARKS	PART CODE								
1		BNHCL30MSN			NUT	M3, S-NI, THIN-TYPE				3
2		BSPB30C6MN			WIND HEAD SCREW	(+1)BIT, M3 X 8 S-NI				3
3		BSPB30D10MN			WIND HEAD SCREW	(+1)BIT, M3 X 10 S-NI				2
4		BSPC30C6MS			CEMS SCREW	(+1)BIT, M3 X 8 BS-NI				1
5		BSPB30C6MT			PAN HEAD SCREW	(+1)BIT, M3 X 6 PLASTIC				2
6		BSPU30C6MN			THIN BIND SCREW	(+1)BIT, M3 X 6 S-NI				1
7		BWU30C55SW			IT. LOCK WASHER	INSIDE TIGHTED, 3 M/M S-ZN				7
8		CCD1B104MM			CERAMIC CAP.	0.1MFD 12.5V -20, +20%	C85	C88		2
9		CCDB025CCM			CERAMIC CAP.	AK 0.5PF 50V -0.25, +0.25PF	C125			1
10		CCDB010CCM			CERAMIC CAP.	CK 1PF 50V -0.25, +0.25PF	C120	C14	C21 C3	5
11							C66			
12		CCDB010CCM			CERAMIC CAP.	PK 1PF 50V -0.25, +0.25PF	C11			1
13		CCDB020CCM			CERAMIC CAP.	CK 2PF 50V -0.25, +0.25PF	C52	C53		2
14		CCDB020CCM			CERAMIC CAP.	PK 2PF 50V -0.25, +0.25PF	C12			1
15		CCDB030CCM			CERAMIC CAP.	CJ 3PF 50V -0.25, +0.25PF	C61			1
16		CCDB030CCM			CERAMIC CAP.	PJ 3PF 50V -0.25, +0.25PF	C229			1
17		CCDB040CCM			CERAMIC CAP.	CH 4PF 50V -0.25, +0.25PF	C19			1
18		CCDB050CCM			CERAMIC CAP.	CF 5PF 50V -0.25, +0.25PF	C50			1
19		CCDB050DPM			CERAMIC CAP.	PH 5PF 50V -0.5, +0.5PF	C5			1
20		CCDB060DPM			CERAMIC CAP.	PH 6PF 50V -0.5, +0.5PF	C106			1
21		CCDB070DPM			CERAMIC CAP.	PH 7PF 50V -0.5, +0.5PF	C115	C124		2

ITEM	PART NAME		PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS		SYMBOLIC OR EXPLODED VIEW NO.			QTY USED
	REMARKS	PART CODE	ASSY								
1		CCDB135CPM			CERAMIC CAP.	PK 1.5PF	50V -0.25, +0.25PF	C10			1
2		CCDB120CPM			CERAMIC CAP.	PH 10PF	50V -0.5, +0.5PF	C131	C45	C60	4
3		CCDB1000IM			CERAMIC CAP.	SL 10PF	50V -0.5, +0.5PF	C110	C55		2
4		CCDB101KPM			CERAMIC CAP.	100PF	50V -10, +10% PH	C20	C222		2
5		CCDB101K0M			CERAMIC CAP.	100PF	50V -10, +10% SL	C104	C227	C63	3
6		CCDB120KPM			CERAMIC CAP.	12PF	50V -10, +10% PH	C108	C128	C161	4
7		CCDB120K0M			CERAMIC CAP.	12PF	50V -10, +10% SL	C113			1
8		CCDB150KPM			CERAMIC CAP.	15PF	50V -10, +10% PH	C121			1
9		CCDB150K0M			CERAMIC CAP.	15PF	50V -10, +10% SL	C225			1
10		CCDB180KPM			CERAMIC CAP.	18PF	50V -10, +10% PH	C1			1
11		CCDB181K0M			CERAMIC CAP.			C160			1
12		CCDB220KPM			CERAMIC CAP.	22PF	50V -10, +10% PH	C155	C156	C157	4
13		CCDB221K0M			CERAMIC CAP.	220PF	50V -10, +10% UJ	C159	C68	C94	3
14		CCDB221K0M			CERAMIC CAP.	220PF	50V -10, +10% SL	C102	C87		2
15		CCDB270K0M			CERAMIC CAP.			C69			1
16		CCDB330KPM			CERAMIC CAP.	33PF	50V -10, +10% PH	C4	C59		2
17		CCDB330K0M			CERAMIC CAP.	33PF	50V -10, +10% SL	C75			1
18		CCDB390KPM			CERAMIC CAP.	35PF	50V -10, +10% CH	C135			1
19		CCDB390KPM			CERAMIC CAP.	35PF	50V -10, +10% PH	C2			1
20		CCDB391K0M			CERAMIC CAP.	390PF	50V -10, +10% SL	C17			1
21		CCDB470K0M			CERAMIC CAP.	47PF	50V -10, +10% CH	C62			1

ITEM	PART NAME		PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS		SYMBOLIC OR EXPLODED VIEW NO.			Q'TY USED
	P.W. BOARD	ASSY									
1			CCDB470KPM		CERAMIC CAP.	47PF	50V -10, +10% PH	C122	C129	C96	3
2			CCDB471KQM		CERAMIC CAP.	470PF	50V -10, +10% SL	C221			1
3			CCDB680KCM		CERAMIC CAP.	68PF	50V -10, +10% CH	C134	C136		2
4			CCDR630KUM		CERAMIC CAP.	68PF	50V -10, +10% UJ	C95			1
5			CCDR680K0M		CERAMIC CAP.	68PF	50V -10, +10% SL	C27			1
6			CCDF050CCM		CERAMIC CAP.	CH 5PF	500V -0.25, +0.25PF	C203			1
7			CCDF080DCM		CERAMIC CAP.			C197	C198	C211	3
8			CCDE1C0DCM		CERAMIC CAP.	CH 10PF	500V -0.5, +0.5PF	C138			1
9			CCDE120KCM		CERAMIC CAP.	12PF	500V -10, +10% CH	C199			1
10			CCDE150KCM		CERAMIC CAP.	15PF	500V -10, +10% CH	C205	C212	C213	3
11			CCDE270KCM		CERAMIC CAP.	27PF	500V -10, +10% CH	C141	C143	C148 C206	6
12								C207	C208		
13			CCDF330KCM		CERAMIC CAP.	33PF	500V -10, +10% CH	C196			1
14			CCDF470KCM		CERAMIC CAP.	47PF	500V -10, +10% CH	C149			1
15			CCDE560KCM		CERAMIC CAP.	56PF	500V -10, +10% CH	C190			1
16			CCDE680KCM		CERAMIC CAP.	68PF	500V -10, +10% CH	C191	C192		2
17			CEAC101ZMN		ELYT. CAPACITOR	100MFD	10V MS	C98			1
18			CEAC330ZMN		ELYT. CAPACITOR			C112	C150	C174 C181	6
19								C71	C84		
20			CEAC470ZMN		ELYT. CAPACITOR			C100	C119	C166 C172	7
21								C184	C185	C231	

		PART NAME		PART CODE		PART NAME		SPECIFICATIONS		SYMBOLIC OR EXPLODED VIEW NO.				Q'TY USED
REMARKS		PART CODE		STOCK NUMBER		PART NAME								
		P235EJ16DA		P235EJ16DA										
1		CEAD10074N				ELYT. CAPACITOR		10MFD 16V MS		C167	C189	C202	C78	5
2										C82				
3		CEAD102ALX				ELYT. CAPACITOR		1000MFD 16V		C90				1
4		CEAD221ZLS				ELYT. CAPACITOR		220MFD 16V SP		C89				1
5		CEAD041074N				ELYT. CAPACITOR		47MFD 16V MS		C86				1
6		CEAF40724N				ELYT. CAPACITOR		4.7MFD 25V MS		C116	C126	C132	C142	11
7										C146	C169	C175	C178	
8										C193	C219	C28		
9		CEAF470ZLS				ELYT. CAPACITOR		47MFD 25V SP		C214				1
10		CEAG02174N				ELYT. CAPACITOR		0.1MFD 50V MS		C79				1
11		CKDB103KBU				CERAMIC CAP.		0.01MFD 50V -10, +10% B		C186	C187	C220	C46	8
12										C47	C7	C8	C9	
13		CKDB103FE4				CERAMIC CAP.		0.01MFD 50V -0, +100% E		C103	C105	C107	C109	42
14										C111	C118	C13	C15	
15										C151	C152	C153	C154	
16										C158	C162	C163	C164	
17										C165	C173	C18	C182	
18										C183	C200	C216	C218	
19										C223	C226	C230	C232	
20										C233	C234	C54	C56	
21										C58	C63	C64	C65	

ITEM	PART NAME		PART CODE	PART NAME	STOCK NUMBER	PART NAME	SPECIFICATIONS		SYMBOLIC OR EXPLODED VIEW NO.				QTY USED
	REMARKS	PART CODE		ASSY									
1				P.W. BOARD ASSY	APTB1116DA				C70	C72	C91	C92	
2									C93	C97			
3		CKDC222KB3M				CERAMIC CAP.			C114	C117	C123	C127	21
4									C130	C133	C137	C139	
5									C140	C145	C147	C188	
6									C194	C195	C201	C204	
7									C209	C210	C217	C51	
8									C6				
9		COMB103KEH				MYLAR CAPACITOR	50V	-10, +10%	C170	C26	C39	C73	
10									C77	C80	C99		
11		COMB104KEH				MYLAR CAPACITOR	50V	-10, +10%	C179	C180			
12		COMB122KEH				MYLAR CAPACITOR	50V	-10, +10%	C177				
13		COMB153KEH				MYLAR CAPACITOR	50V	-10, +10%	C176				
14		COMB222KEH				MYLAR CAPACITOR	50V	-10, +10%	C168	C171	C34	C35	
15									C40	C41	C81		
16		COMB223KEH				MYLAR CAPACITOR	50V	-10, +10%	C36				
17		COMB224KEH				MYLAR CAPACITOR	50V	-10, +10%	C24				
18		COMB333KEH				MYLAR CAPACITOR	50V	-10, +10%	C74				
19		COMB472KEH				MYLAR CAPACITOR	50V	-10, +10%	C76				
20		COMB473KEH				MYLAR CAPACITOR	50V	-10, +10%	C22	C23	C25	C29	
21									C30	C31	C32	C33	

ITEM	PART NAME		PART CODE		PART NAME	SPECIFICATIONS		SYMBOLIC OR EXPLODED VIEW NO.		Q'TY USED
	REMARKS	PART CODE	STOCK NUMBER	PART CODE						
1								C37		
2		CSSFR68MDN			TANTALUM CAP.	0.68MED 35V -20, +20%		C38		
3		CSSFQ10MDN			TANTALUM CAP.	1MED 35V -20, +20%		C228	C42	
4		CSSF1C0MDN			TANTALUM CAP.	10MED 35V -20, +20%		C215		
5		CSSF2R2MDN			TANTALUM CAP.	2.2MED 35V -20, +20%		C48		
6		CTZ4200K01			TRIMMER CAP.			CT8		
7		CTZ6200H01			TRIMMER CAP.			CT1	CT2 CT3 CT4	
8		CTZ7200K01			TRIMMER CAP.			CT5	CT6 CT7	
9		FBR455F11M			CERAMIC FILTER			FL3		
10		FF11R7F03A			XTAL FILTER			FL1	FL2	
11		FZR455A01M			CERAMIC FILTER			FD1		
12		LA1EE0708A			RF COIL			L21		
13		LA1GE0701A			RF COIL			L18		
14		LA1GG0703A			RF COIL			L28	L29 L30 L31	
15								L33		
16		LCADA3038A			RF COIL			L26	L27	
17		LDAD83610T			RF. COIL			L9		
18		LDAD83622N			RF COIL			L13	L14 L20	
19		LDAD03604R			RF COIL			L15	L17	
20		LF100KE02T			CHOKO COIL			L1	L2 L3	
21		LF563JC02S			RF COIL			L32		

ITEM	PART NAME		PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.			QTY USED
	REMARKS	PART CODE								
1		LF681JC01K			RF COIL		L4	L5		2
2		LJ119H034W			CHOKE COIL		CH1			1
3		LL2CN1001A			RF COIL		L22			1
4		LL2GM1001A			RF COIL		L16			1
5		LL2JR1001A			RF COIL		L25			1
6		LL6JR1502A			RF COIL		L24			1
7		LMBDC1502V			RF COIL		L23			1
8		LNBBCL504U			RF COIL		L19			1
9		LZ5PE1501Z			RF COIL		T21	T22		2
10		QDCRB122XU			VARI-CAP. DIODE	B8-122 28V NO-RANK 26MIN	D11	D12	D20	3
11		QDGIN60XXT			GERMANIUM DIODE	IN60 NC-RANK	D4			1
12		QDGLS34XXT			GERMANIUM DIODE	1S34 NO-RANK	D6	D7		2
13		QDSRA244XU			SI DIODE	BS244A	D17	D18	D19	3
14		QDSF14AXXA			SILICON DIODE	F14A NO-RANK	D10	D25	D26	3
15		QDSMA150XN			SILICON DIODE	MA150 VF=1.2V, VR=35V NO-RANK 24MIN	D1	D14	D15 D16	16
16							D2	D22	D24 D27	
17							D29	D3	D30 D33	
18							D38	D39	D8 D9	
19		QDSM1301XF			SILICON DIODE	M1301-Q1-A VR=80V NO-RANK 26MIN	D34	D35	D36 D37	4
20		QDZ8D10E8A			ZENER DIODE	RD10E82 VZ=9.52-9.80V R-RANK25MIN	D31			1
21		QDZ8D6EXXA			ZENER DIODE	RD6.2E 5.8-6.6V NO-RANK	D13			1

ITEM NO.	PART NAME		PART CODE	STOCK NO.		REMARKS	PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.			QTY USED
	P.W.BUILD ASSY	APTRM1160A												
1	Q07R03EX1A								ZENER DIODE	RD9.1E VZ=9.12-9.68V B-RANK	D21			1
2	Q0MC0555F4								I.C.	UPC555F	U2			1
3	Q0MC0577AA								I.C.	UPC577F	U1			1
4	Q0MC0592FA								I.C.	UPC592F2 E,F,H-RANK AF-AMP	U3			1
5	Q0MC04553AJ								I.C.	NJM455ED OPERATIONAL AMP.	U6			1
6	Q0MC07205DT								I.C.	TA72C5AP-C 5.8k AUDIO-POWER-AMP	U4			1
7	Q00P1102AN								I.C.	PLL02A(MN6C40)	U5			1
8	QTA0733XAA								TRANSISTOR	2SA733 Q-RANK	Q20	Q22		2
9	QTA0835XAN								TRANSISTOR	2SA885 Q,R,S-RANK	Q34			1
10	QTB0512XAN								TRANSISTOR	2SR512 P-RANK	Q36			1
11	QTC0710X3E								TRANSISTOR	2SC710 D-RANK	Q16	Q5		2
12	QTC0763XAF								TRANSISTOR	2SC763 C,D-RANK	Q10	Q11	Q14 Q17	6
13											Q24	Q25		
14	QTC0900X8A								TRANSISTOR	2SC900 F-RANK	Q7			1
15	QTC09451FA								TRANSISTOR	2SC945L P,Q-RANK	Q15	Q18	Q21 Q23	10
16											Q30	Q31	Q32 Q37	
17											Q6	Q8		
18	QTC1346XAN								TRANSISTOR	2SC1846 Q,R,S-RANK	Q19	Q33		2
19	QTC2053XAE								TRANSISTOR	2SC2052 NC-RANK	Q26			1
20	QTD0313X8C								TRANSISTOR	2SD313 E-RANK	Q35			1
21	QTF0237XAM								TRANSISTOR	MRF237 NO-RANK (RF.PWR. 8W.MAX)	Q28			1

ITEM	PART NAME		PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.			QTY USED
	REMARKS	PART CODE								
1		QTF0238XAM	P.W. 3042D ASSY	APTRM116DA	TRANSISTOR	MRF238 NO-RANK (RF.PWR. 30W.MAX)	Q29			1
2		QTK0223AAS			TRANSISTOR	2SK23A 540	Q2	Q3		2
3		QTK0120XAS			TRANSISTOR	2SK120 2-RANK	Q12	Q13		2
4		QTK0125XAS			TRANSISTOR	2SK125 S-RANK	Q9			1
5		QTL3N201BM			TRANSISTOR	3N201R	Q1			1
6		QTN4427XAM			TRANSISTOR	2N4427 NO-RANK	Q27			1
7		QVESV03XXD			VARIATOR	SV03 NO-RANK (VF:1.60V-2.00V)	D32			1
8		RAH472K08N			R ARRAY		RA1			1
9		RC18GK100X			FIXED CARBON R.	1/8W 10 OHM 10%	R133			1
10		RC18GK104X			FIXED CARBON R.	1/8W 100K OHM 10%	R127	R128	R2	4
11		RC18GK223X			FIXED CARBON R.	1/8W 22K OHM 10%	R1			1
12		RC18GK331X			FIXED CARBON R.	1/8W 330 OHM 10%	R3			1
13		RD25PJ100X			CARBON FILM R.	0.25W 10 OHM 5%	R13	R14		2
14		RD25PJ101X			CARBON FILM R.	0.25W 100 OHM 5%	R22	R30	R33 R34	6
15							R5	R68		
16		RD25PJ102X			CARBON FILM R.	0.25W 1K OHM 5%	R116	R118	R60	3
17		RD25PJ103X			CARBON FILM R.	0.25W 10K OHM 5%	R104	R105	R108 R12	5
18							R6			
19		RD25PJ104X			CARBON FILM R.	0.25W 100K OHM 5%	R111	R88	R89 R90	4
20		RD25PJ105X			CARBON FILM R.	0.25W 1M OHM 5%	R106			1
21		RD25PJ102X			CARBON FILM R.	0.25W 1.2K OHM 5%	R97			1

ITEM	PART NAME		STOCK NUMBER	PART NAME	SPECIFICATIONS		SYMBOLIC OR EXPLODED VIEW NO.				Q'TY USED
	REMARKS	PART CODE									
1		RD25PJ151X		CARBON FILM R.	0.25W 150 OHM 5%		R69				1
2		RD25PJ152X		CARBON FILM R.	0.25W 1.5K OHM 5%		R10	R47	R52	R58	5
3							R66				
4		RD25PJ153X		CARBON FILM R.	0.25W 15K OHM 5%		R32	R44			2
5		RD25PJ161X		CARBON FILM R.	0.25W 180 OHM 5%		R25				1
6		RD25PJ222X		CARBON FILM R.	0.25W 2.2 OHM 5%		R136				1
7		RD25PJ221X		CARBON FILM R.	0.25W 220 OHM 5%		R112	R27	R76		3
8		RD25PJ222X		CARBON FILM R.	0.25W 2.2K OHM 5%		R115	R117	R120	R124	6
9							R134	R87			
10		RD25PJ223X		CARBON FILM R.	0.25W 22K OHM 5%		R110	R24	R26	R40	5
11							R48				
12		RD25PJ224X		CARBON FILM R.	0.25W 220K OHM 5%		R29	R59			2
13		RD25PJ272X		CARBON FILM R.	0.25W 2.7K OHM 5%		R113	R75			2
14		RD25PJ273X		CARBON FILM R.	0.25W 27K OHM 5%		R103				1
15		RD25PJ331X		CARBON FILM R.	0.25W 330 OHM 5%		R114	R72	R9		3
16		RD25PJ332X		CARBON FILM R.	0.25W 3.3K OHM 5%		R109	R119	R8		3
17		RD25PJ391X		CARBON FILM R.	0.25W 390 OHM 5%		R122				1
18		RD25PJ392X		CARBON FILM R.	0.25W 3.9K OHM 5%		R135				1
19		RD25PJ467X		CARBON FILM R.	0.25W 4.7 OHM 5%		R137	R74			2
20		RD25PJ471X		CARBON FILM R.	0.25W 470 OHM 5%		R35				1
21		RD25PJ472X		CARBON FILM R.	0.25W 4.7K OHM 5%		R107	R11	R21	R23	9

ITEM	PART NAME		PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.				Q'TY USED
	P. W. R. J. A. S. S. Y.	P. W. R. J. A. S. S. Y.									
1							R31	R73	R81	R92	
2							R98				
3	RD25PJ472X				CARBON FILM R.	0.25W 47K OHM 5%	R129	R41			2
4	RD25PJ474X				CARBON FILM R.	0.25W 470K OHM 5%	R46				1
5	RD25PJ561X				CARBON FILM R.	0.25W 560 OHM 5%	R71	R94			2
6	RD25PJ562X				CARBON FILM R.	0.25W 5.6K OHM 5%	R15	R16	R17	R42	4
7	RD25PJ680X				CARBON FILM R.	0.25W 68 OHM 5%	R70				1
8	RD25PJ681X				CARBON FILM R.	0.25W 680 OHM 5%	R102	R43			2
9	RD25PJ682X				CARBON FILM R.	0.25W 6.8K OHM 5%	R67				1
10	RD25PJ820X				CARBON FILM R.	0.25W 82 OHM 5%	R49				1
11	RD25PJ822X				CARBON FILM R.	0.25W 8.2K OHM 5%	R93				1
12	RD25PJ823X				CARBON FILM R.	0.25W 82K OHM 5%	R123	R45			2
13	RD25TJ822X				CARBON FILM R.	0.25W 8.2K OHM 5%	R132				1
14	RD25VJ101X				CARBON FILM R.	0.25W 100 OHM 5%	R139	R56	R63	R64	4
15	RD25VJ102X				CARBON FILM R.	0.25W 1K OHM 5%	R100	R82	R84		3
16	RD25VJ104X				CARBON FILM R.	0.25W 100K OHM 5%	R19	R20	R96		3
17	RD25VJ151X				CARBON FILM R.	0.25W 150 OHM 5%	R131				1
18	RD25VJ154X				CARBON FILM R.	0.25W 150K OHM 5%	R61				1
19	RD25VJ221X				CARBON FILM R.	0.25W 220 OHM 5%	R50	R55			2
20	RD25VJ222X				CARBON FILM R.	0.25W 2.2K OHM 5%	R51	R78	R79	R85	7
21							R86	R91	R99		

ITEM	PART NAME		STOCK NUMBER	PART NAME	SPECIFICATIONS		SYMBOLIC OR EXPLODED VIEW NO.		QTY USED
	P.W.BUARD ASSY	PART CODE							
			ADTBML16DA						
1		RD25VJ223X		CARBON FILM R.	0.25W 22K OHM 5%		R18		1
2		RD25VJ273X		CARBON FILM R.	0.25W 27K OHM 5%		R54		1
3		RD25VJ47X		CARBON FILM R.	0.25W 47 OHM 5%		R95		1
4		RD25VJ472X		CARBON FILM R.	0.25W 4.7K OHM 5%		R83		1
5		RD25VJ473X		CARBON FILM R.	0.25W 47K OHM 5%		R53	R65	2
6		RD25VJ561X		CARBON FILM R.	0.25W 560 OHM 5%		R57		1
7		RD25VJ562X		CARBON FILM R.	0.25W 5.6K OHM 5%		R28		1
8		RD25VJ632X		CARBON FILM R.	0.25W 6.8K OHM 5%		R80		1
9		RGHANJ2214		M-OXIDE FILM R.	1/2W 220 OHM 5%		R121		1
10		RGHANJ331R		M-OXIDE FILM R.	1/2W 330 OHM 5%		R101		1
11		RGHANJ472R		M-OXIDE FILM R.	1/2W 47 OHM 5%		R77		1
12		RGHANJ112H		M-OXIDE FILM R.	1/2W 1K OHM 5%		R125		1
13		RG2ANJ8206		M-OXIDE FILM R.	2W 82 OHM 5%		R126		1
14		QPGN350203		SEMI-FIXED VR.	5K OHM B-CURVE		RV1	RV3	2
15		QPGN350373		SEMI-FIXED VR.	50K OHM B-CURVE		RV2		1
16		TRA8GZ0014		RF COIL			L8		1
17		TPA8GZ0024		RF COIL			T1	T2	2
18		TR07LA004W		I.F.T.			T8		1
19		TR07LA014S		RF COIL			T10	T9	2
20		TR07MNC01M		I.F.T.			T6	T7	2
21		TR10GPC03S		RF COIL			T11	T14 T15 T16	4

I E M	PART NAME		PART CODE		PART NAME	SPECIFICATIONS		SYMBOLIC OR EXPLODED VIEW NO.			Q'TY USED
	REMARKS	PART CODE	STOCK NUMBER	PART CODE							
1		TR10GP0045			RF COIL			I18			1
2		TR10GZC094			RF COIL			I12	I13	I20	3
3		TR10GZ010M			RF COIL			I17	I19		2
4		TR13GM005S			RF COIL			I3			1
5		TR13GM007S			RF COIL			I4			1
6		TR13GM009S			RF COIL			I5			1
9		XAS1R3005X			XTAL OSCILLATOR	HC-43/U	12.800MHZ	X2			1
10		XAS1B3006X			XTAL OSCILLATOR			X3			1
11		XAS1B3007X			XTAL OSCILLATOR			X4			1
12		XAS1B3008X			XTAL OSCILLATOR			X5			1
13		XAZ1A5002X			XTAL OSCILLATOR	HC-18/U	11.245MHZ	X1			1
14		YFL0000003			FERRITE BEAD						1
15		YFL0000004			FERRITE BEAD						2
16		YJF105004Z			JUNCTION JACK.			J1			1
17		ZZZ000002			F-BRAID WIRE						1
18											
19											
20											
21											

		PART NAME		PART CODE		PART CODE		PART NAME		SPECIFICATIONS		SYMBOLIC OR EXPLODED VIEW NO.				Q'TY USED
REMARKS		P.W.B.C.A.R.D. ASSY		APIL0074AA		STOCK NUMBER										
ITEM		PART CODE		STOCK NUMBER		PART NAME										
1		ACCN4442GFA				CONN CORD ASSY						AC701				
2		ACCN4442GEA				CONN CORD ASSY						AC702				
3		PTLD074CQX				PRINTED W.B. BOARD										
4		QL=SL2271C				LED		SL2271 GREEN COM-A.				LED701				
5		WTG913BFX				SOLID WIRE						ND701				
6						CUSTOMER STOCK NO.										
EXPLODED ASSEMBLY		CYBERNET PART NAME		CYBERNET PART CODE		CYBERNET PART NAME		CUSTOMER STOCK NO.								
ITEM		PART CODE		STOCK NUMBER		CYBERNET PART NAME										
1		ACCN4444GFA				CONN CORD ASSY						AC501				
2		PTSW126CQX				PRINTED W.B. BOARD										
3		QDSMA150XV				SILICON DIODE		MA150 VF=1.2V, VR=35V NJ-RANK 24MIN				D501 D502 D503 D504				1
4												D505 D506 D507 D508				
5												D509 D510 D511 D512				
6												D513 D514 D515				
7		SR255C401H				ROTARY SWITCH						S501				1
8																
9																
10																
11																
12																
13																

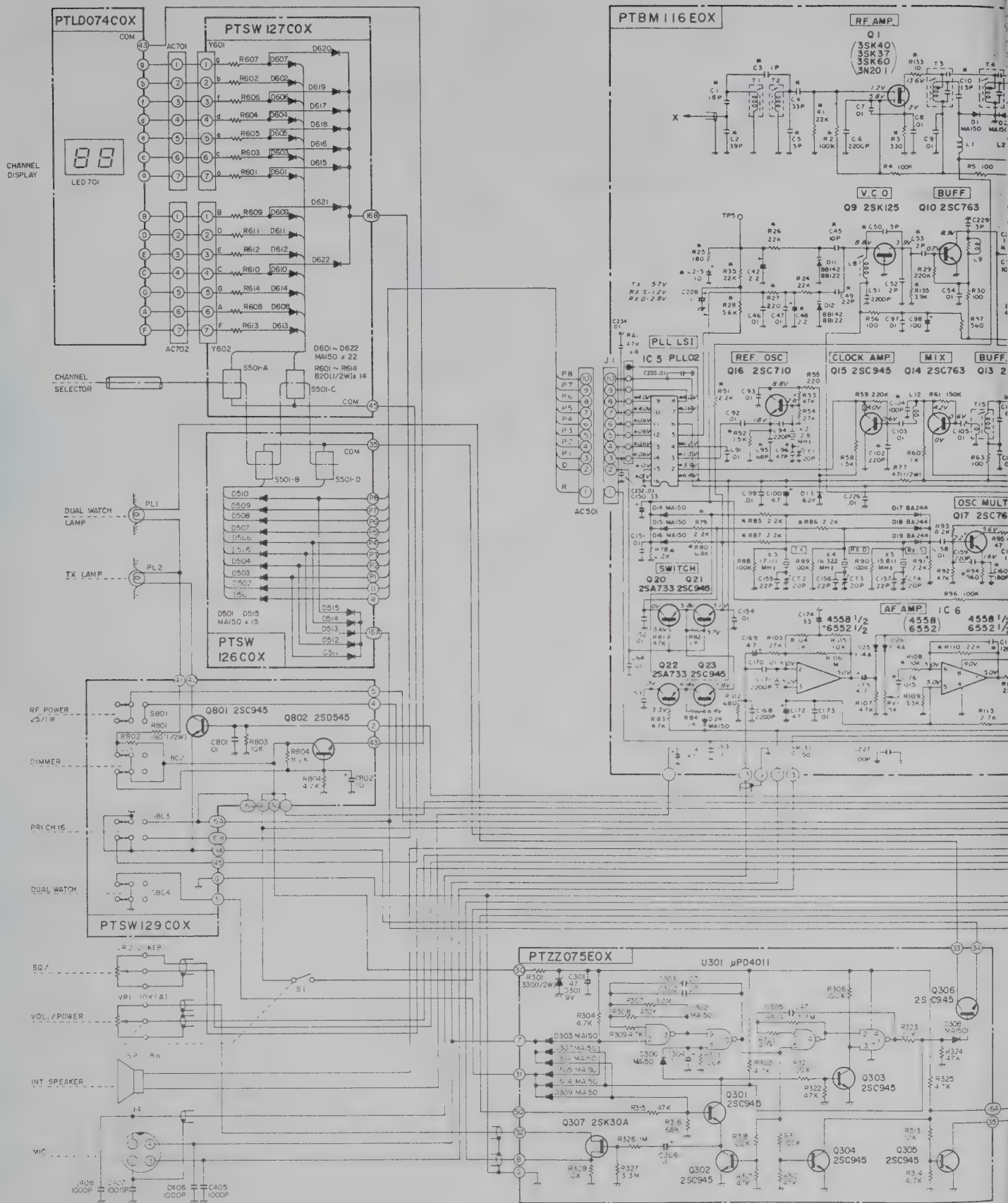
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ITEM NO.	PART NAME		PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.				Q'TY USED
	REMARKS	PART CODE									
1		CEAD1C0ZMN			ELYT. CAPACITOR	10MED 16V MS				C802	1
2		CKCR103PEM			CERAMIC CAP.	0.01MED 50V -0, +100% F				C801	1
3		MW201BSG03			TERMINAL						14
4		PTSW129COX			P.W. WORD						1
5		QTC0945AEA			TRANSISTOR	2SC945A P,Q-RANK				Q801	1
6		QTD0545XAC			TRANSISTOR	2SD545 F-RANK				Q802	1
7		RD25TJ103X			CARBON FILM R.	0.25W 10K OHM 5%				R803	1
8		RD25TJ221X			CARBON FILM R.	0.25W 220 OHM 5%				R802	1
9		RD25TJ472X			CARBON FILM R.	0.25W 4.7K OHM 5%				R805	1
10		RD25TJ822X			CARBON FILM R.	0.25W 8.2K OHM 5%				R804	1
11		RGHANJ181R			M-OXIDE FILM R.	1/2W 180 OHM 5%				R801	1
12		SPO4FAX03A			PUSH SWITCH					S801	1
13											
14											
15											
16											
17											
18											
19											
20											
21											

ITEM NO.	PART NAME		PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.			Q'TY USED
	REMARKS	PART CODE								
1		CFAC470ZMN			ELYT. CAPACITOR		C301			1
2		CEAGOR17MN			ELYT. CAPACITOR	0.1MFD 50V MS	C306			1
3		CEAG01CZMN			ELYT. CAPACITOR	1MFD 50V MS	C304			1
4		COM0274KEH			MYLAR CAPACITOR		C302	C303		2
5		COMB473KEH			MYLAR CAPACITOR	0.047MFD 50V -10, +10%	C305			1
6		MW201BS003			TERMINAL					10
7		MW401CX001			SHORT JUMPER	JW-10				4
8		PTZ7075E0X			P.W.BOARD					1
9		QDSMA150XN			SILICON DIODE	MA150 VF=1.2V, VR=35V NO-RANK 24MIN	D302	D303	D304 D305	9
10							D306	D307	D308 D309	
11							D310			
12		QDZMZ409CE			ZENER DIODE	MZ409-02-C C-RANK	D301			1
13		Q0004011AA			I.C.	UPD4011C QUADRIUPLE 2-INPUT NAND GATE	U301			1
14		QTC0945AFA			TRANSISTOR	2SC945A P, O-RANK	Q301	Q302	Q303 Q304	6
15							Q305	Q306		
16		QTK0030A6T			TRANSISTOR	2SK30A Y-RANK	Q307			1
17		RD25TJ103X			CARBON FILM R.	0.25W 10K OHM 5%	R313	R328		2
18		RD25TJ104X			CARBON FILM R.	0.25W 100K OHM 5%	R306	R310	R311 R318	5
19							R321			
20		RD25TJ105X			CARBON FILM R.	0.25W 1M OHM 5%	R326			1
21		RD25TJ223X			CARBON FILM R.	0.25W 22K OHM 5%	R323			1

		PART NAME		PART CODE								
		P.W.ROD ASSY		APTZZ075AA								
REMARKS		PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS			SYMBOLIC OR EXPLODED VIEW NO.		Q'TY USED		
1		RD25TJ235X		CARBON FILM R.				R307	R319	R327		
2		RD25TJ472X		CARBON FILM R.	0.25W	4.7K	OHM	5%	R302	R304	R309	R314
3								R320	R325			
4		RD25TJ473X		CARBON FILM R.	0.25W	47K	OHM	5%	R312	R315	R317	R322
5								R324				
6		RD25TJ474X		CARBON FILM R.	0.25W	470K	OHM	5%	R308			
7		RD25TJ683X		CARBON FILM R.	0.25W	68K	OHM	5%	R316			
8		RGHANJ331B		M-OXIDE FILM R.	1/2W	330	OHM	5%	R301			
9												

ITEM	REMARKS	PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.				Q'TY USED
1		RSPS3CQ4NS		FLAT HD SCREW						4
2		MJJ7865MC07		TRAY						1
3		MX621BC001		LOCK						2
4		VS333PF001		SHEET L						1
5		VS333RF002		SHEET R						1
6										
7										
8										
9										
21										



NOTE:

1. ALL VOLTAGES MEASURED FROM COMMON NEGATIVE CHASSIS GROUND WITH VTVM AT NO SIGNAL.
2. CAPACITORS VALUES ARE IN μF UNLESS OTHERWISE NOTED. P = PICO FARAD
3. RESISTORS VALUES ARE IN OHM K = K OHM
4. * VARIABLE

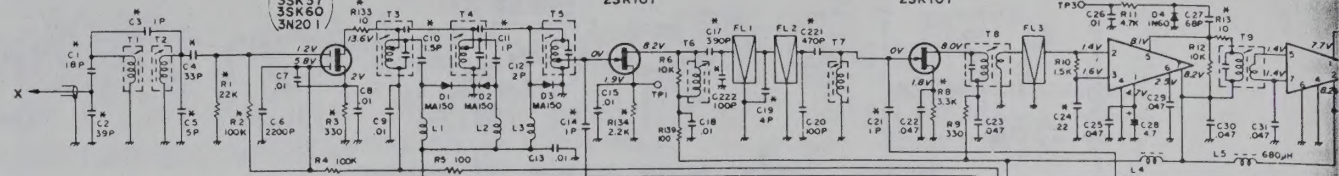
■ AT CHANNEL 16
 X SQUELCHED
 ■ HI TX PWR
 ⊙ LO TX PWR
 Δ UN LOCKED

PTBM116EOX

RF AMP.

1ST MIX.

2ND MIX.

IF AMP.
IC 1 μ PC577HIF AMP.
IC 2 μ PC577H

V.C.O.

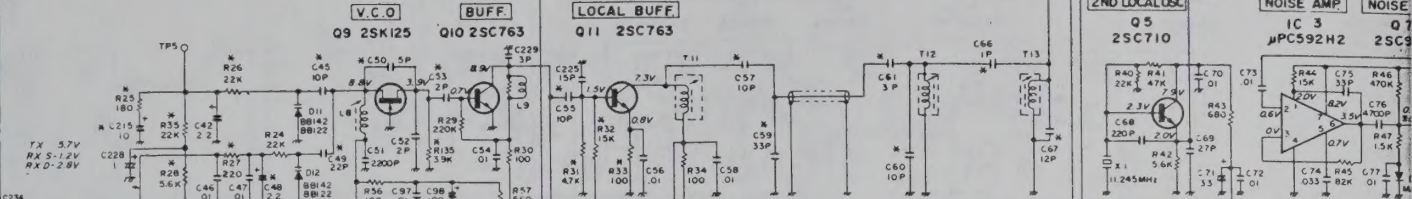
BUFF.

LOCAL BUFF.

2ND LOCAL OSC.

NOISE AMP.

NOISE

PLL LSI
IC 5 PLL02

REF. OSC.

CLOCK AMP.

MIX.

BUFF. AMP.

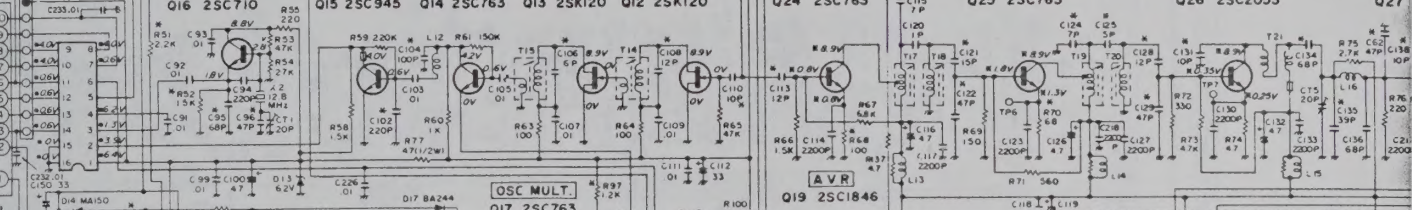
BUFF. AMP.

TX BUFF.

RF AMP.

1ST PRE DRIV.

2ND PRE DRIV.



PTZZ075EOX

U301 μ PD4011